REMARKS/ARGUMENTS

Claims 1-38 were pending in the present application. The present response amends claims 1, 19, and 33, and cancels claims 12-15, 27-28, 32, and 37-38, leaving pending in the application claims 1-11, 16-26, 29-31, and 33-36. Reconsideration of the rejected claims is respectfully requested.

I. Objection to the Specification

The specification is objected to as failing to provide basis in the specification for the claimed subject matter. Particularly:

Claim 1 is objected to as lacking support for "evaluating characteristics of the sample based on the generated output signals" (OA p. 2). This limitation is supported, for example, at page 4, lines 18-page 5, line 8, as well as in the claims as originally filed. As such, the meaning of the limitation and of every term used therein should be apparent from the descriptive portion of the specification.

Claims 2 and 19 are objected to as lacking support for the limitation "is less than 5mm in diameter" (OA p. 2). This limitation is supported, for example, at page 7, lines 13-19; as well as in the claims as originally filed. As such, the meaning of the limitation and of every term used therein should be apparent from the descriptive portion of the specification.

Claims 7, 8, 23, 24, 33, and 34 are objected to as lacking support for the limitation "in diameter" (OA p. 2). It is assumed that the Examiner is looking upon MPEP §608.01, which states in part that "the meaning of every term used in any of the claims should be apparent from the descriptive portion of the specification" and "while an applicant is not limited to the nomenclature used in the application as filed, he or she should make appropriate amendment of the specification whenever this nomenclature is departed from by amendment of the claims so as to have clear support or antecedent basis in the specification for the new terms appearing in the claims". The reasons for the objections in the Office Action are confusing, as the limitations were in the claims as originally filed, not added through amendment. Further, a term such as "in diameter" is non-ambiguous, and the Office Action has not set forth any reason why one of ordinary skill in the art would be confused as to the meaning of the term "in diameter". Due in part to the confusion, claims 2 and 9 have been amended in hopes of clarifying the antecedent basis for the term limitation with respect to the previous claims from which those claims depend.

There should be no confusion as to the meaning of the term "in diameter" with respect to the specification as the exact terminology is used with respect to spot size in the specification, such as at page 7, lines 13-15.

The objected-to limitations of claims 17, 18, 19, 30, 31, and 22 were also in the claims as originally filed, and can find support in the specification.

Due in part to the above-discussed confusion, it is not believed that any correction other than what has been done is necessary. Applicants therefore respectfully request that the objection with respect to these claims be withdrawn, or that further clarification be provided in order to properly respond to any outstanding rejections.

II. Objection to the Claims

Claims 14, 28, and 38 are objected to, but have been canceled for reasons unrelated to patentability. As such, Applicants respectfully submit that the objections are now moot.

III. Rejection under 35 U.S.C. §103

Claims 1-12, 17-26, 30, 31, and 33-35 are rejected under 35 U.S.C. §103(a) as being obvious over *Norton* (US 5,917,594) in view of *Wagner* (US 6,256,097) in view of *Johs* (US 6,549,282).

Claim 1 as amended recites a broadband ellipsometer for evaluating the characteristics of a sample, defined by:

> a broadband light source generating a polychromatic probe beam, said probe beam having UV and visible wavelengths;
>
> an all-refractive focusing optical system for focusing the probe beam onto a spot on the surface of the sample, said all-refractive focusing optical system including **three lenses** that are transparent to both UV and visible wavelengths and with the refractive powers of the lenses being selected to reduce chromatic aberration of the optical system, the three lenses **including two convex calcium fluoride lenses disposed on opposing sides of a concave fused silica lens, the optical system further including a lens mounting fixture for minimizing stress on the three lenses in order to minimize induced birefringence**;
>
> an analyzer system for monitoring a portion of the probe beam light reflected from the sample and generating output signals responsive thereto; and
>
> a processor for evaluating characteristics of the sample based on the output signals.

(*emphasis added*). Such an ellipsometer is not rendered obvious by *Norton*, *Wagner*, and *Johs*.

Norton teaches a focusing optical system based primarily on a reflective spherical mirror (Abstract; Summary; col. 3, lines 41-45). *Norton* proposes "broadband spectroscopic measurement systems using a spherical mirror" (col. 3, lines 41-45), which utilize refractive

elements to correct "spherical aberration caused by off-axis reflection from the mirror" (col. 3, lines 45-60; col. 6, lines 52-59). *Norton* utilizes a reflective optical system for broadband applications because, according to *Norton*, "[w]hen the wavelength range is large, refractive optics exhibit too much chromatic aberration" (col. 1, lines 33-47). N*orton* therefore not only fails to disclose a purely refractive focusing optical system as claimed for broadband applications, but in fact teaches away from such a refractive optical system. As *Norton* fails to disclose the elements recited in claim 1, *Norton* cannot render claim 1 obvious.

Wagner does not make up for the deficiencies in *Norton* with respect to claim 1. *Wagner* teaches that "a focusing optic, consisting of one or more elements of either transmissive or reflective type, forms a focus at the surface of the sample to be measured" (col. 5, lines 24-26). *Wagner* does not, however, teach or suggest a three lens, all-refractive system including two convex calcium fluoride lenses disposed on opposing sides of a concave fused silica lens, or a lens mounting fixture for minimizing stress on the three lenses in order to minimize induced birefringence as required by Applicants' claim 1. *Wagner* therefore cannot render claim 1 obvious, either alone or in combination with *Norton*.

Johs does not make up for the deficiencies in *Wagner* and *Norton* with respect to claim 1. *Johs* teaches "multi-element input and output lenses" each consisting of "two lens elements" of different materials separated by an air gap (Abstract; col. 16, lines 1-8). *Johs* does not, however, teach or suggest a three lens, all-refractive system including two convex calcium fluoride lenses disposed on opposing sides of a concave fused silica lens, or a lens mounting fixture for minimizing stress on the three lenses in order to minimize induced birefringence as required by Applicants' claim 1. Further, *Johs* is directed to eliminating birefringence in the "analysis of ellipsometric data" by accounting for the birefringence in the signal intensity equations (col. 14, line 65-col. 15, line 7; col. 21, line 29-col. 22, line 24). *Johs* does not teach or suggest a lens mounting fixture for minimizing the actual amount of birefringence. *Johs* therefore cannot render Applicants' claim 1 obvious, either alone or in any combination with *Norton* and *Wagner*. Dependent claims 2-11 and 17-18 also are therefore not rendered obvious.

Claim 19 recites a broadband ellipsometer for evaluating the characteristics of a sample, defined by:

> a broadband light source generating a polychromatic probe beam, said probe beam having UV and visible wavelengths having a range of at least 500nm;

an **all-refractive focusing optical system** for focusing the probe beam onto a spot on the surface of the sample, said spot having a diameter less than 5 mm, said all-refractive focusing optical system **including three lenses** that are transparent to both UV and visible wavelengths and with the refractive powers of the lenses being selected to reduce chromatic aberration of the optical system such that the focal shift over the range of wavelengths is less than five percent of the mean focal length of the optical system, **the three lenses including two convex calcium fluoride lenses disposed on opposing sides of a concave fused silica lens, the optical system further including a lens mounting fixture for minimizing stress on the three lenses in order to minimize induced birefringence**;

an analyzer system for monitoring a portion of the probe beam reflected from the sample and generating output signals responsive thereto; and

a processor for evaluating characteristics of the sample based on the output signals.

(*emphasis added*). As discussed above, *Norton*, *Wagner*, and *Johs* fail to teach or suggest a three lens, all-refractive focusing optical system including two convex calcium fluoride lenses disposed on opposing sides of a concave fused silica lens, or a lens mounting fixture for minimizing stress on the three lenses in order to minimize induced birefringence. As such, claim 19 and dependent claims 20-26 and 29-31 cannot be rendered obvious by any combination of *Norton*, *Wagner*, and *Johs*.

Claim 33 recites a broadband ellipsometer for evaluating the characteristics of a sample, defined by:

a broadband light source generating a polychromatic probe beam, said probe beam having UV and visible wavelengths having a range of at least 500nm and including 200nm;

an **all-refractive focusing optical system** for focusing the probe beam onto a spot on the surface of the sample, said spot having a diameter less than 3mm, said all-refractive focusing optical system **including two convex calcium fluoride lenses disposed on opposing sides of a concave fused silica lens**, the refractive powers of the lenses being selected to reduce chromatic aberration of the optical system such that the focal shift over the range of wavelengths is less than five percent of the mean focal length of the optical system, the optical system further **including a lens mounting fixture for minimizing stress on the three lenses in order to minimize induced birefringence**;

an analyzer system including a detector for monitoring a portion of the probe beam light reflected from the sample and generating output signals responsive thereto, said output signals corresponding to a plurality of wavelengths simultaneously;

an imaging system including an aperture for transmitting a portion of the probe beam reflected from the sample to the detector and wherein the portion of the probe beam transmitted by the imaging system corresponds to area on the sample less than 100 microns in diameter; and

a processor for evaluating characteristics of the sample based on the generated output signals.

(*emphasis added*). As discussed above, *Norton*, *Wagner*, and *Johs* fail to teach or suggest a three lens, all-refractive focusing optical system including two convex calcium fluoride lenses disposed on opposing sides of a concave fused silica lens, or a lens mounting fixture for minimizing stress on the three lenses in order to minimize induced birefringence. As such, claim 33 and dependent claims 34-36 cannot be rendered obvious by any combination of *Norton*, *Wagner*, and *Johs*.

Claims 13, 14, 27, 28, and 38 are rejected under 35 U.S.C. §103(a) as being obvious over *Norton* in view of *Wagner* and *Johs* and further in view of *Maruyama* (US 6,101,035). Claims 13, 14, 27, 28, and 38 have been canceled for reasons unrelated to patentability such that the rejection is now moot.

Claims 15, 32, and 37 are rejected under 35 U.S.C. §103(a) as being obvious over *Norton* in view of *Wagner* and *Johs* and further in view of *Appius* (DE 3635637 A1). These claims have been canceled for reasons unrelated to patentability such that the rejection is now moot.

Claims 16, 29, and 36 are under 35 U.S.C. §103(a) as being obvious over *Norton* in view of *Wagner* and *Johs* and further in view of *Nagano* (US 5,798,876). Claims 16, 29, and 36 depend from claims 1, 19, and 33, which are not rendered obvious by *Norton* in view of *Wagner* and *Johs* for reasons including those discussed above. *Nagano* does not make up for the deficiencies in these references with respect to claims 1, 19, and 33, as *Nagano* teaches a lens barrel including a series of lenses each having "their centers accurately coinciding with the optical axis" (col. 27, lines 31-43). *Nagano* does not teach or suggest that an all-refractive focusing optical system can be used successfully to focus the probe beam onto a spot on the surface of a sample in a broadband ellipsometer. *Nagano* also fails to teach or suggest a three-lens, all-refractive focusing optical system including two convex calcium fluoride lenses disposed on opposing sides of a concave fused silica lens, or a lens mounting fixture for minimizing stress on the three lenses in order to minimize induced birefringence. As such, claims 1, 19, and 33, as well as dependent claims 16, 29, and 36, cannot be rendered obvious by any combination of *Norton*, *Wagner*, *Johs*, and *Nagano*.

Applicants therefore respectfully request that the rejection with respect to claims 1-11, 16-26, 29-31, and 33-36 be withdrawn.

VI. Amendment to the Claims

Unless otherwise specified, amendments to the claims are made for purposes of clarity, and are not intended to alter the scope of the claims or limit any equivalents thereof. The amendments are supported by the specification and do not add new matter to the specification.

V. Conclusion

In view of the above, it is respectfully submitted that the application is now in condition for allowance. Reconsideration of the pending claims and a notice of allowance is respectfully requested.

The Commissioner is hereby authorized to charge any deficiency in the fees filed, asserted to be filed, or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Deposit Account No. 50-1703, under Order No. TWI-12410. **A duplicate copy of the transmittal cover sheet attached to this Response to Office Action Mailed February 27, 2004, is provided herewith.**

Respectfully submitted,

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Dated: April 14, 2004

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